DOCUMENT RESUME

ED 240 139 TM 840 027

AUTHOR Bassler, Otto C.; Caulkins, Thomas G.
TITLE Using Test Results to Improve Instruction.
PUB DATE Jan 84
NOTE 11p.
PUB TYPE Guides - Non-Classroom Use (055)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Elementary Secondary Education; *Instructional Improvement; Models; Scores; *Standardized Tests; *Testing Programs; Test Items; *Test Results; *Test Use

ABSTRACT

A model for summarizing test scores and using them to modify instructional programs is presented. The proposed model consists of two types of summaries of the data gathered through standardized tests. The first summary contains individual and single class results. Information in a "Class Item Response Record" chart provides individual student responses for each item on the test, class percent correct for each item, and national percent correct. This chart enables teachers to determine the skills that individual students have or have not attained, the concepts learned by a majority of students in the class, how the class differs from the national norms, and the strengths and weaknesses of the instructional program. The second summary of data contains a response record chart for all students taking the test in a given school. It contains identifying information pertaining to school, grade level and test, item numbers, item description, and the percent of students responding to each choice for each question. Percent of correct response for the city and national testing population are also included. Suggestions for using the charts and activities for principals to use test results to improve instruction are presented. (PN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED240139

USING TEST RESULTS TO IMPROVE INSTRUCTION

by

Otto C. Bassler
Professor of Mathematics Education
George Peabody College for Teachers
of
Vanderbilt University

and

Thomas G. Caulkins
Coordinator of Group Testing
Metropolitan Public Schools

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

O. Bassler

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

TM 810 027

January 1984

One of the current emphases in the school program is an emphasis on standardized testing. The public is made aware of the results of testing in the schools when they read of declines in SAT or ACT results; the lack of skills of school children and adults, as indicated by the National Assessment of Educational Progress; or from the movement toward competency-based testing in the schools. In each of these instances, low scores are used as a basis to criticize the school program, and, often, this is where the testing program ends. Rather--administering, scoring, and reporting test scores should be the <u>beginning</u> of the testing program which has as a goal the modification and strengthening of the instructional program.

Practically every school has a standardized testing program. To derive the greatest benefit from the testing program, the results of the tests must be summarized so that the skills, or lack thereof, for individual pupils, classes, and schools might be identified. These data should be interpreted by comparing achievement to the goals established for the curriculum. When discrepancies are indicated by a lack of congruency of test achievement and instructional goals, it becomes necessary to re-examine and, if necessary, adapt the instructional program of the school. The principal, as the instructional leader in the school, should play an important role in the utilization of test results to improve the instructional program. It is the principal's responsibility to have test data for students, classes, and school summarized and disseminated to teachers. These data may then be used to strengthen instruction and, consequently, have a beneficial effect on learning. The purpose of this article is to present one model of summarizing test scores and discussing how this model can be used to modify the instructional program.

The proposed model consists of two types of summaries of the data gathered through standarized tests. The first summary contains individual and single class results. The information in Chart I provides individual student responses for each item on the test, class percent correct for each item, and national percent correct. By studying the information in this chart, teachers can determine the skills that individual students have or have not attained, the concepts that have been learned by a majority of students in the class, and how their class differs from the national norms. It is also possible to determine the strengths and weaknesses of the instructional program. If principals do not provide such data to teachers and do not encourage teachers to study and interpret such data, a major goal of an effective testing program will be missed.

Insert Chart I

A great deal of information is summarized in Chart I. In the upper left-hand corner descriptive information about the class and test is reported. Names of students are reported as column heads. Student responses to each item are reported in the columns under student names. A plus indicates a correct response, a number indicates the incorrect response choice, and a blank indicates that the student made no response. The four columns at the left of the table indicate the problem number, the skill tested by each item, and the percent right for the local class (LC), and for the national norm group (NT). Note that the items are arranged by skills in a logical manner rather than the order in which students complete the items on the test. This order is roughly the same as the order in which the skills would be developed.

Some interesting conclusions can be drawn from an examination of the data presented in this chart. Several are discussed below.

Examination of the response records of individual students can provide insight about their skill development. For example, Student 1 has learned addition and subtraction skills but is, perhaps, a slow worker since no responses were given for items 20, 21, and 22, the last three items on the test. Student 2 is very likely responding to regrouping situations in addition with an incorrect algorithm, since all regrouping items were answered incorrectly. Consistent use of the 5 response should be checked further. In this case, the 5 response was "None of the above" which might indicate an unusual type error pattern. Both Students 2 and 3 responded incorrectly to items that required regrouping but generally had correct responses for the other items. This indicates a need for re-teaching place value and its application to the addition and subtraction processes. Different patterns may be observed in the records of other students. Individual response records can provide the teacher with information about the skill development of each child, what skills have not been learned, and hence, places where re-teaching should occur.

Comparison of the local and national percent correct indicates how the class compares to the national average. Looking at the figures in these columns, we see that the percents are close for all except five items--namely, items 6, 9, 12, 21, and 22. All of these items involve regrouping in subtraction. This implies that either the skill was not taught prior to the test or that students did not learn from previous instruction. When wide discrepancies such as this exist, it is beneficial to examine the test items and the group responses. Two problems and group responses are shown below.

Item 6	536	0	323	1	4%
	-159	●	377	3	12%
		0	423	11	44%
		0	695	1	4%
		0	None of the above	4	16%
		No	Response	5	20%
Item 22	500	0	366	2	8%
	- 34	0	434	1	4%
		●	466	2	8%
		0	534	13	52%
		0	None of the above	1	4%
		No	Response	6	24%

Looking at these two examples, it is evident that many students are responding to these items by using an incorrect algorithm; that is, a large percent of the students are subtracting the larger digit minus the smaller digit in each column, without regard to whether the digits are in the minuend or subtrahend. This is important information for the teacher because, to effectively teach subtraction with regrouping, students must first unlearn the incorrect procedure before learning the correct one.

Further examination of the local and national percents indicates that, although the differences in percents are not great on the addition regrouping problems, the local class percents are consistently below the national percents. This indicates that regrouping in addition and subtraction is a problem in the instructional program which the teacher needs to address.

The second summary of data contains a response record for all students taking the test in a given school. Chart II contains identifying information pertaining to school, grade level and test, item numbers, item description, and the percent of students responding to each choice for each question. The correct item is indicated by ** and the percent of students responding correctly is indicated in the school column.

Insert Chart II about here

Percent of correct response for the city and national testing populations are also included. This permits a comparison of the school results with those obtained city-wide or nationally. A visual display of these percents is presented graphically at the right of the chart.

One use of Chart II would be to examine all items on which the students in the school scored below a stated percent, such as 40%. Based on this criterion, Items 12, 15, 21, 22, 24, 25, 26, and 27 would be analyzed. Item 12 tests division of a two-digit number by a two-digit number. Suppose the test item was $58\overline{)85}$ which requires students recognize a remainder. The low percent correct may indicate the need for instruction which emphasizes quotients and remainders. The subtraction in item 15 required regrouping since a mixed number was to be subtracted from a whole number. Regrouping causes continuing problems for students and teachers should be encouraged to look for more effective methods to teach this troubling concept.

The other six items where students had difficulty all involved division of fractions. An examination of the textbooks will probably indicate that this is one of the topics taught late in the school year and the low test results may be a consequence of little or no instruction on these skills prior to the testing. If test scores are to improve, it may be necessary to resequence the instructional program, or to delay administration of the test until these skills have been taught.

If the school scores consistently below the city scores, it may be due to a different emphasis in the curriculum, to a school population of less capable students, to ineffective teaching techniques, or to chance differences. In any case, lower school scores may indicate to the principal that there is a need to revise the curriculum. Percents correct less than the national average may indicate similar conditions. Consistently low scores

indicate a need to study the curriculum and make modifications on a school or city-wide basis. Chart 2 provides information of more use to the principal or curriculum director; whereas Chart I is more useful to the individual classroom teacher.

All of the preceding discussion presumes that the goals of the instructional program were determined before the testing program was adopted. Examination of response patterns for the concepts tested and the individual items used to test these concepts is not for the purpose of teaching the test but rather to determine the extent to which the goals of instruction have been accomplished.

Based upon our experience with the testing program in a relatively large Metropolitan school system, we recommend the following activities for principals who use test results to improve instruction:

1. Have the results of the standardized testing program summarized by individual classes and by school.
2. Study these summaries to determine any inconsistencies between instructional goals and test results that have implications for the instructional program.
3. Provide classroom teachers with the summary of data for their classroom and encourage them to study both group and individual response records.
4. Help individual teachers to interpret the testing results and modify instruction in ways indicated as needed by the test results.
5. Use school results as a basis for school curriculum modifications if the test results indicate this is needed.

CHART 1. CLASS ITEM RESPONSE RECORD*

GRADE 03
ROOM 0303
STUDENTS 25

ABC TEST FORM X

MATH SKILLS

PROB. NO.	CONCEPT	PCT RIGHT LC.	PCT RIGHT NT	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5	. . .	STUDENT 25
	ADDITION									
3	2 ONE-DIG.	92	93	+	+	+	+	+		2
15	4 ONE-DIG., HOR 12	96	92	+	+	+	+	2		+
2	TWO DIG + ONE DIG HOR 12	92	90	+	+	+	+	+		+
14	2 TWO-DIG REGROUP	64	75	+	5	5		3		+
16	3 TWO-DIG REGROUP	56	63	+	5	3		+		+
1	THREE DIG + TWO DIG	84	83	+	+	+	+	4		+
18	2 THREE DIG REGROUP	60	64	+	5	5		2		+
20	2 FOUR DIG REGROUP	56	60		5	1		+		+
	SUBTRACTION									
4	2 ONE DIG	96	94	+	+	+	+	+		+
21	TWO DIG - ONE DIG REGROUP	20	59		+	2	5	3		3
19	2 TWO DIG HORIZ	92	91	+	+	+	+	+		2
5	THREE DIG-TWO DIG	88	85	+	+	+	2	5		+
9	THREE DIG-TWO DIG REGROUP	8	42	+	3	3	5	3		5
7	MULT OF TEN-ONE DUG HORIZ REGROUP	68	83	+	2	1	+	+		1
22	MULT OF HUND-TWO DIG REGROUP	8	31		4	4	5	4		5
6	THREE DIG-THREE DIG REGROUP	12	37	+	3	3	5	+		3
	MONEY COMPUTATIONS									
11	ADD 2 AMTS HORIZ	68	70	+	3	+	2	+		+
8	ADD 2 AMTS VERT	76	72	+	+	+	+	4		+
13	ADD 2 AMTS VERT & REGROUP	56	59	+	5	4		+		+
10	SUBT 2 AMTS HORIZ	64	69	+	2	+	4	+		2
17	SUBT 2 AMTS VERT	68	71	+	+	+	+	4		+
12	SUBT 2 AMTS VERT & REGROUP	8	27	3	2	2	5	2		5

* The data are ficticious and were constructed to illustrate the interpretations presented in the text.

CHART II. SCHOOL ITEM RESPONSE RECORD *

STANDARDIZED TESTING PROGRAM ITEM RESPONSE SUMMARY FOR SPRING 19XX

NORTH JUNIOR HIGH — ABC TEST

GRADE 07

SUB TEST MATH COMPUTATION — CITY COUNT 4,927 — SCHOOL COUNT 285

NO.	ITEM NAME	PER CENT RESPONSE FOR EACH ANSWER						PERCENTAGE CORRECT			DEVIATION FROM THE NORM *--BELOW--* *--ABOVE--*												
		NR	1	2	3	4	5	SCH	CITY	NAT	-	10	8	6	4	2	0	2	4	6	8	10	+
	WHOLE NUMBERS																						
1	ADD 4 NOS. (3+4 DIGITS)	1	3	7	4	**		85	85	83							N*						
13	SUBT. (4 DIGITS)	1	2	6	**	12		79	83	83						S	*						
7	MULT. (4 DIGITS x 3 DIGITS)	2	12	**	8	8		69	63	65						C	N	S					
8	MULT. (4 DIGITS x 2 DIGITS)	4	15	12	**	7		61	55	58						C	N	S					
17	DIV. (4 DIGITS x 2 DIGITS)	7	16	**	18	7		52	51	53						*	N						
25	DIV. (2 DIGITS x 2 DIGITS)	16	11	**	26	12		35	31	34						C	N	S					
	FRACTIONS																						
2	ADD 2 MIXED NOS. (VERT.)	2	16	26	**	2		54	48	54					C		*						
4	ADD 2 PROP. FRAC. (HORIZ.)	1	14	10	**			75	70	66							N		C				S
5	ADD 3 MIXED NOS. (HORIZ.)	3	35	6	**	8		47	46	54				*			N						
6	ADD 2 MIXED NOS. (HORIZ.)	4	26	21	**	4		46	45	53				*			N						
3	ADD PROP. FRAC. x MIXED NO.	1	13	5	36	**		45	44	53			C	S			N						
18	SUBT. PROP. FRAC. (HORIZ.)	4	**	22	20	7		46	44	49					C	S	N						
21	SUBT. MIXED FRAC. FROM WH. NO.	2	**	48	10	9		31	27	32					C		S	N					
20	SUBT. PROP. FRAC. (HORIZ.)	4	19	14	**	12		52	51	56					C	S		N					
16	SUBT. MIXED NOS. (VERT.)	5	12	25	11	**		48	46	53			C	S				N					
23	SUBT. MIXED NOS. (RENAME)	5	19	25	**	8		43	42	50			*					N					
9	MULT. 2 PROP. FRAC.	6	**	13	8	21		53	49	54					C		S	N					
10	MULT. 2 MIXED FRAC. (HORIZ.)	6	10	**	24	18		43	40	43						C		*					
11	MULT. WH. NO. x PROP. FRAC.	8	**	7	13	26		46	43	47						C	S	N					
14	MULT. 2 PROP. FRAC. x WH.	7	**	19	19	11		45	43	42								N	C	S			
19	DIV. PROP. FRAC. x WH. NO.	12	**	8	22	17		40	34	40					C			*					
12	DIV. MIXED NO. x MIXED NO.	15	11	24	**	13		38	35	35								*		S			
26	DIV. MIXED NO. x PROP. FRAC.	15	9	19	27	**		29	25	29						C		*					
22	DIV. 2 PROP. FRAC.	15	14	27	10	**		34	31	35						C	S	N					
15	DIV. WH. NO. x FRAC.	15	27	10	**	8		39	37	39							C	*					
24	DIV. MIXED NO. x PROP. FRAC.	17	13	22	15	**		33	23	29					C			N		S			
27	DIV. AND MULT. FRACTIONS	21	8	21	**	13		36	32	32								*		S			

* The data are fictitious and only a few items from a test are included.